

**REMARKS**

This amendment responds to the Office Action dated December 23, 2002 in which the Examiner rejected claims 1, 2 and 10-13 under 35 U.S.C. § 102(b) and objected to claims 3-9 and 14 as being dependent upon a rejected base claim but would be allowable if rewritten in independent form.

As indicated above, claim 12 has been amended in order to correct a typographical error and claims 1 and 11 have been amended in order to make explicit what is implicit in the claims. It is respectfully submitted that the amendment to the claims are unrelated to a statutory requirement for patentability and does not narrow the literal scope of the claims.

Claim 1 claims a polarizing device and claim 11 claims a method of polarizing a piezoelectric material. The device and method include a temperature-raising portion and a constant-temperature bath. The temperature-raising portion raises the temperature of the piezoelectric material to a temperature required to polarize the piezoelectric material. The constant-temperature bath has an atmosphere of gas which is kept at a required temperature and includes a polarizing portion for polarizing the piezoelectric material while the temperature of the piezoelectric material is kept at the required temperature. The temperature-raising portion and the constant-temperature bath are separated from each other.

Through the structure and method of the claimed invention, raising the temperature of the piezoelectric material at a first location while polarizing the piezoelectric material at a second location separated from the first location, as claimed in claims 1 and 11, the claimed invention provides a polarizing device and method in which the polarizing process

can be finished in a short amount of time. The prior art does not show, teach or suggest the invention as claimed in claims 1 and 11.

Claims 1, 2 and 10-13 were rejected under 35 U.S.C. § 102(b) as being anticipated by *Inoi et al.* (U.S. Patent No. 5,758,397).

*Inoi et al.* appears to disclose a process of fabricating the piezoelectric ceramic transformer without cracks. (col. 1, lines 9-10) The piezoelectric ceramic plate 21 is placed in an oven 34, and the piezoelectric ceramic plate 21 is heated to 300 to 350 degrees in centigrade in the air. The d.c. power source 33 creates an electric field in the piezoelectric ceramic plate 21 between the stripe-shaped electrodes 23a/23b and the comb-like electrodes 22a/22b, and the electric field is regulated to 0.5 kilo-volt/millimeter to 0.7 kilo-volt/millimeter. The temperature in the oven 34 is decreased to 100 degrees in centigrade or less without changing the d.c. potential applied between the stripe-shaped electrodes 23a/23b and the comb-like electrodes 22a/22b. When the temperature reaches 100 degrees in centigrade, the electric field is removed from the piezoelectric ceramic plate 21. Then, the generator section 2b of the piezoelectric ceramic plate 21 is polarized in the longitudinal direction LG. This polarization is called as "electric field quenching technique". The resultant structure is illustrated in FIG. 5C. Subsequently, the driving section 21a is polarized in the direction of thickness TH. The conductive jigs 31 and 32 are removed, and metallic probes 35a and 35b are pressed against the comb-like electrodes 22a and 22b, respectively. The piezoelectric ceramic plate 21 is dipped into silicon oil 36, and the silicon oil is heated to 100 degrees to 200 degrees in centigrade. A d.c. power source 37 is connected to the metallic probes 35a/35b, and creates an electric field of 2 to 3

kilo-volt/millimeter between the comb-like electrodes 22a and 22b. As a result, the driving section 21a of the piezoelectric ceramic plate 21 is polarized in the direction of thickness TH as shown in FIG. 5D. This polarization is called a "high-temperature polarizing technique". (col. 8, lines 39 through col. 9, line 2)

Thus, *Inoi et al.* merely discloses placing a piezoelectric ceramic plate 21 in an oven 34 where the temperature is first raised and then the plate is polarized. Nothing in *Inoi et al.* shows, teaches or suggests raising the temperature at a first location while polarizing the piezoelectric material at a second location separated from the first location as claimed in claims 1 and 11. Rather, *Inoi et al.* teaches away from the claimed invention and raises the temperature and polarizes the plate in a single oven 34.

Since nothing in *Inoi et al.* shows, teaches or suggests a temperature-raising portion and constant-temperature bath are separated from each other as claimed in claims 1 and 11, it is respectfully requested that the Examiner withdraws the rejection to claims 1 and 11 under 35 U.S.C. § 102(b).

Claims 2, 10 and 12-13 depend from claims 1 and 11 and recite additional features. It is respectfully submitted that claims 2, 10 and 12-13 would not have been anticipated within the meaning of 35 U.S.C. § 102(b) at least for the reasons as set forth above. Therefore, it is respectfully requested that the Examiner withdraws the rejections to claims 2, 10 and 12-13 under 35 U.S.C. § 102(b).

Since objected to claims 3-9 and 14 depend from allowable claims, it is respectfully requested that the Examiner withdraws the objection thereto.

The prior art of record, which is not relied upon, is acknowledged. The references taken singularly or in combination do not anticipate or make obvious the claimed invention.

Thus, it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, applicant respectfully petitions for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

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**Attachment to Amendment**

**Marked-up Claims 1, 11 and 12**

1. (Amended) A polarizing device useful for polarizing a piezoelectric material having two surfaces in high-temperature gas, the polarizing device comprising:

temperature-raising portion for raising the temperature of the piezoelectric material to a temperature required to polarize the piezoelectric material; and

a constant-temperature bath having an atmosphere of gas that is kept at the required temperature, the constant-temperature bath incorporating a polarizing portion for polarizing the piezoelectric material while the temperature of the piezoelectric material is kept at the required temperature, wherein the temperature-raising portion and the constant-temperature bath are separated from each other.

11. (Amended) A method of polarizing a piezoelectric material inside high-temperature gas, the method comprising the steps of:

raising the temperature of the piezoelectric material, located at a first location, to a temperature required to polarize the piezoelectric material; and

polarizing the piezoelectric material by placing the piezoelectric material at a second location, separated from the first location, into an atmosphere of gas the temperature of which is maintained at the required temperature.

12. (Amended) A method of polarizing a piezoelectric material inside high-temperature gas according to Claim 11, further comprising the step of:

**Attachment to Amendment**

**Marked-up Claims 1, 11 and 12**

[of] performing an aging operation on the polarized piezoelectric material in the same atmosphere of gas.